

IV. REMARKS

Claims 1-8 and 10-20 are pending in this application. Claims 1-8, 10, 14, and 17 have been amended, and claim 9 has been cancelled. Applicants do not acquiesce in the correctness of the rejections and reserve the right to present specific arguments regarding any rejected claims not specifically addressed. Further, Applicants reserve the right to pursue the full scope of the subject matter of the original claims in a subsequent patent application that claims priority to the instant application. Reconsideration in view of the following remarks is respectfully requested.

Applicants respectfully submit that entry of this Amendment is proper under 37 C.F.R. § 1.116(b) because this Amendment: (a) places the application in condition for allowance as discussed below; (b) does not raise any new issues requiring further search and/or consideration; and (c) places the application in better form for appeal. Accordingly, Applicants respectfully request entry of this Amendment.

A. Rejection for failure to comply with 37 C.F.R. § 1.1821-1.825

In the Office Action, the Office asserts that Applicants have failed to comply with the requirements of 37 C.F.R. § 1.821-1.825. Applicants note at the outset that the sequence to which the Office refers is not a specific sequence, or relevant to the invention described and claimed in the instant application, but merely lists an arbitrary combination of nucleic acids included for the purpose of illustrating how the claimed invention *could* be used upon a *hypothetical* nucleotide sequence. Nonetheless, Applicants have herein amended the specification at page 6, paragraph 2, according to the Office's suggestion, to include the sequence identifier, "SEQ ID NO: 1" preceding the fictitious sequence in the text of the description of the patent application. Applicants note that (1) a one-page paper copy of the

Sequence Listing required under 37 C.F.R. § 1.821(c), and (2) a computer readable form (CRF) copy of the Sequence Listing as required by 37 C.F.R. § 1.821(e) have been previously submitted on 20 July 2004. Applicants accordingly respectfully submit that the relevant requirements have been satisfied.

B. Rejections under 35 U.S.C. § 101

In the Office Action, claims 1-20 were rejected under 35 U.S.C. § 101 as being allegedly directed to non-statutory subject matter. Specifically, the Office states that the “statutory requirement requires all three issues (concrete, tangible, AND useful result) to be fulfilled.” (Office Action at 5.) The Office Action cites “the absence of a tangible result, such as some sort of outputting” (*id.*) in support of the position that the claimed invention does not recite statutory subject matter. By this response, Applicants have amended claim 1 according to the Office’s suggestion, to recite the additional limitation of “a system for outputting the electronic version of the nucleotide chain, including the encrypted coding regions and the unencrypted non-coding regions” (claim 1, lines 6-7). Thus, amended claim 1 recites a tangible result, to wit, a “system for outputting...,” (*id.*) as well as “a concrete and useful result” (noted in the Office Action at 5, line 18), to wit, “securing an electronic transmission of a nucleotide chain...” (claim 1, lines 1-2), as required (*see* Office Action at 5) for the recitation of statutory subject matter.

With respect to claim 8, Applicants have herein amended this claim to recite the features of: receiving the encrypted coding regions and unencrypted non-coding regions, decrypting the encrypted coding regions, regenerating the nucleotide chain, ... and outputting the regenerated nucleotide chain (claim 8). Applicants respectfully submit that the method including the features mentioned above, satisfies the requirement of a tangible result (described in the Office Action at

p. 5) as discussed above relative to claim 1. As suggested by the Office, the invention includes “outputting the regenerated nucleotide chain,” an amendment which finds support in the specification at pp.7-8. The features of receiving, decrypting, and regenerating were previously recited in the now-canceled claim 9. Accordingly, Applicants respectfully request withdrawal of the rejection of claim 8.

With respect to claims 14 and 17, as noted in the Office Action (at p. 4), “whether the program product claims are statutory ... rests on whether the method/program is statutory.” Applicants have herein amended claim 14 to include the feature, “means for outputting the encrypted coding regions and the non-encrypted non-coding regions,” as well as claim 17 to include the feature, “means for outputting the decoded nucleotide chain,” as discussed above relative to claims 1 and 8. Accordingly, Applicants submit that claims 14 and 17 are directed to statutory subject matter for the reasons stated above relative to claims 1 and 8.

To this extent, Applicants respectfully submit that the subject matter in claims 1, 8, 14, and 17 is directed to statutory subject matter. With respect to claims 2-7, 10-13, 15, 16, and 18-20, Applicants herein incorporate the arguments presented above with respect to claims 1, 8, 14, and 17 from which claims 2-7, 10-13, 15, 16, and 18-20 depend. The dependent claims are believed to be allowable based on the above arguments, as well as for their own additional features. Accordingly, Applicants respectfully request that the rejections to claims 1-8 and 10-20 be withdrawn.

C. Rejections under 35 U.S.C. § 112, second paragraph

In the Office Action, claims 1-7 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. With respect to claim 1, Applicants have herein amended the claim to provide

further clarification by reciting in the preamble, “A computer-implemented security system” (claim 1, line 1). Applicants submit that this amendment provides the necessary clarification requested by the Office (Office Action, p. 6) regarding structural limitations intended for the system. Applicants have additionally amended the preambles of claims 2-7 accordingly.

With further respect to claim 1, the Office has requested clarification regarding the metes and bounds of the claim, specifically relating to the use of “electronic version,” language which previously appeared in the preamble of claim 1, but not in the body of the claim. In response, Applicants have further amended claim 1 to include the feature, “a system for outputting the electronic version of the nucleotide chain, including the encrypted coding regions and the unencrypted non-coding regions,” (claim 1, lines 6-7) to provide improved clarification. Applicants respectfully submit that the rejections of claims 1-7 be withdrawn on the basis of these curative amendments.

Applicants submit that the aforementioned amendments place claims 1-7 in condition for allowance. Accordingly, Applicants respectfully request that the Office withdraw the rejections to claims 1-7.

D. Rejections under 35 U.S.C. § 102(b)

In the Office Action, claims 1-4, 6-12, 14, 15, 17, 18, and 20 are rejected under 35 U.S.C. § 102(b) as being anticipated by Rungsarityotin et al. (Wasinee Rungsarityotin et al., *Grid computing and bioinformatics development. A case study on the Oryza sativa (rice) genome*, 74 PURE APPL. CHEM. 891-97 (2002)).

With respect to claim 1, Applicants submit that Rungsarityotin does not disclose, among other features, “a system for selectively encrypting only the coding regions identified in the

nucleotide chain.” In the Office Action, it is asserted that Rungsarityotin teaches a security system for securing an electronic version of a nucleotide chain, including visualizing, analyzing, and transporting XML-based DNA data (Office Action, p. 7), which uses expressed sequence tags (ESTs) treated as genes and marker names along the sequence with non-coding regions merely listed as a line, and that this anticipates the invention as claimed herein (Office Action, p. 7-8. Applicants respectfully disagree with the Office on this point. Specifically, Applicants assert that “encryption” refers to the process of using an algorithm, or cipher, to apply a series of well-defined steps to plaintext information, ultimately securing or obfuscating a message. The operation of a cipher generally depends on a piece of auxiliary information, called a key, also referred to as a cryptovariable. The encryption procedure varies depending on the key, which changes the algorithm’s detailed operations.

Applicants assert that the use of a cipher to encrypt genomic data, which is taught, among other features, in the claimed invention, is not actually present in Rungsarityotin. Instead, as described in the Office Action, Rungsarityotin teaches a system and method which transform bioinformatics genomic data from different sites into a *standard* format (Rungsarityotin, p. 892 at line 26-27. Note that “standard” and “encrypted” are not synonymous), and transporting it in XML-document format. Applicants agree that Rungsarityotin teaches these specific features, however, Applicants respectfully submit that encryption is not taught in Rungsarityotin, because transformation of the data into a standard format does not equate to “selective encrypting only the coding regions identified in the nucleotide chain” as taught in claim 1. Applicants additionally submit that, contrary to the Office’s assertion, encryption is also not taught on p. 894 (Fig. 2 and Paragraph 1). There, as the Office notes, Rungsarityotin teaches aligning corresponding sequences in BAC genomic sequences from Thai rice and the Nipponbare strain

of rice, using express sequence tags (ESTs) as candidate genes. As discussed above, this in no way implicates the use of an encryption algorithm.

This interpretation of the language in Rungsarityotin is further supported by the further disclosure that “the grid security system will support the single signed-on capability so that access authentication should be verified merely the first time.” (Rungsarityotin et al., *supra*, at 892, second from last paragraph.) This indicates that the “security infrastructure” mentioned above pertains to access (as in, password protection) to the database query form, a security feature which can easily be accomplished by a cookie.

With respect to the rejections of independent claims 8 and 14, Applicants note that each claim includes features similar in scope to those already addressed above with respect to claim 1. Further, the Office relies on the same arguments and interpretations of Rungsarityotin as discussed above with respect to claim 1. To this extent, Applicants herein incorporate the arguments presented above with respect to claim 1, and respectfully request withdrawal of the rejections of claims 8 and 14 for the above-stated reasons.

With respect to claim 17, Applicants submit that, as discussed above relative to encryption, Rungsarityotin also does not teach a program product including, *inter alia*, the feature of “selectively decrypting only the coding regions identified in the encoded nucleotide chain; and means for reassembling the coding and non-coding regions to generate a decoded nucleotide chain” (claim 17). As Rungsarityotin did not teach encryption in the first place, the reference naturally also does not teach the reverse act.

Applicants additionally submit that Rungsarityotin does not teach a program product including, *inter alia*, the feature of a “means for reassembling the coding and non-coding regions to generate a decoded nucleotide chain.” (Claim 17.) In contrast, as the Office notes (*see* Office

Action, p. 10), Rungsarityotin teaches the use of non-coded regions represented by a line in the resulting physical map of BAC sequence from chromosome 1 of the rice genome. Applicants respectfully submit that the resulting map (*see* Rungsarityotin, Fig. 2) does not represent a “decoded nucleotide chain.” In fact, it is not a “chain” at all, but rather, an assemblage of separate, unlinked, independent sections of genomic data. Where non-coding regions are represented by a line, rather than a genomic sequence to fill in the gaps between the coding data, it is not possible to “reassemble the coding and non-coding regions to generate a decoded nucleotide chain,” as recited in claim 17.

Accordingly, Applicants respectfully request that the rejections to claims 1, 8, 14, and 17 be withdrawn. With respect to claims 3-4, 6-7, 10-12, 15, 18, and 20, Applicants herein incorporate the arguments presented above with respect to claims 1, 8, 14, and 17 from which claims 3-4, 6-7, 10-12, 15, 18, and 20 depend. The dependent claims are believed to be allowable based on the above arguments, as well as for their own additional features. Accordingly, Applicants respectfully request that the rejections to these claims be withdrawn as well.

E. Rejections under 35 U.S.C. § 103(a)

In the Office Action, claims 5, 13, 16, and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rungsarityotin et al. (Wasinee Rungsarityotin et al., *Grid computing and bioinformatics development. A case study on the Oryza sativa (rice) genome*, 74 PURE APPL. CHEM. 891-97 (2002)) as applied to claims 1-4, 6-12, 14, 15, 17, 18, and 20 above, and further in view of Jorgenson et al. (US 2004/0221163A1). Applicants respectfully submit that these claims

are allowable based on the arguments above with respect to independent claims 1, 8, 14, and 17, and accordingly requests that the rejection be withdrawn.

V. CONCLUSION

Applicants respectfully submit that the Application as presented is in condition for allowance. Should the Examiner believe that anything further is necessary in order to place the application in better condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michael Hoffman", is written over a horizontal line. The signature is fluid and cursive.

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(JMT)

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